

Virtual reality for pain relief in gynaecological care

Josep Estadella-Tarriel

Hospital de la Santa Creu i Sant Pau, Department of Obstetrics and Gynecology, Universitat Autònoma de Barcelona, Institut d'Investigació Biomèdica Sant Pau (IIB Sant Pau), Barcelona, Spain

Keywords: Hysteroscopy, virtual reality, pain

Hysteroscopy is integral to optimising the diagnosis and treatment of intrauterine pathologies in contemporary gynaecology. Indeed, the landscape of surgical practice has been transformed by advances in hysteroscopic surgical technologies. Common interventions that were previously performed in the operating room are now conducted in an outpatient setting. This change in practice reduces the costs and utilisation of scarce health care resources and enhances safety, convenience, and efficiency of clinical management.¹ However, despite these benefits, procedures may fail and need to be discontinued because of pain.

Pain transmission pathways are inherently complex and susceptible to modulation through various mechanisms. One such modulator is anxiety, which can significantly alter the pain experience through the activation of the amygdala. Extensive evidence highlights the direct correlation between pre-procedural anxiety and heightened pain perception, as well as increased analgesic consumption. Consequently, implementing relaxation strategies aimed at reducing pre-procedural anxiety has been shown to effectively mitigate perceived pain levels. Additionally, targeted focus on specific tasks can direct cerebral activity away from brain regions implicated in pain processing, such as the thalamus and insula. This approach, known as distraction, enables a reduction

in perceived pain intensity despite the constancy of the nociceptive stimulus.² The use of virtual reality (VR) has emerged as a valuable tool in this context, offering both relaxation and distraction mechanisms that can effectively decrease patient discomfort during gynaecological and obstetric procedures. By immersing patients in controlled, engaging virtual environments, VR not only fosters relaxation but also provides cognitive distraction, thereby diminishing the overall pain experience without pharmacological intervention.³

A systematic review and meta-analysis evaluated the efficacy of VR in reducing acute procedural pain across various clinical settings.⁴ The study synthesised data from 20 studies involving 776 participants undergoing various painful procedures, including burn wound care, physiotherapy for burns, needle-related interventions, and minor surgical procedures. The findings indicated that VR was particularly effective in reducing pain during needle-related procedures and physical therapy for burns, with a standardised mean difference (MD) in pain score reduction of -0.49 [95% confidence interval (CI): -0.83 to -0.14, $P=0.006$]. However, the effect of VR on other surgical procedures was less pronounced, with high statistical heterogeneity observed across studies. The authors concluded that while VR showed potential as a non-pharmacological intervention for pain management,

Corresponding Author: Josep Estadella-Tarriel, MD, Hospital de la Santa Creu i Sant Pau, Department of Obstetrics and Gynecology, Universitat Autònoma de Barcelona, Institut d'Investigació Biomèdica Sant Pau (IIB Sant Pau), Barcelona, Spain

E-mail: jestadella@santpau.cat **ORCID ID:** orcid.org/0000-0001-7140-3091

Received: 02.06.2025 **Accepted:** 03.06.2025 **Epub:** 17.06.2025

Cite this article as: Estadella-Tarriel J. Virtual reality for pain relief in gynaecological care. Facts Views Vis Obgyn. [Epub Ahead of Print].



further methodologically robust studies were needed to confirm its efficacy and explore its cost-effectiveness in clinical practice.⁴

A recent systematic review and meta-analysis has evaluated the use of VR during hysteroscopy.⁵ The study synthesised data from six randomised controlled trials (RCTs) involving a total of 457 patients. The primary outcomes included pain and anxiety levels during and after the hysteroscopy, assessed using the visual analogue scale. The findings indicated a significant reduction in pain scores during the procedure for the VR group compared to standard care [MD: -1.43, 95% CI (-1.69, -1.16), $P < 0.001$]. Additionally, anxiety levels were significantly lower among patients receiving VR intervention ($P = 0.01$). Post-procedure pain scores also decreased significantly in the VR group [MD: -1.52, 95% CI (-1.78, -1.26), $P < 0.001$]. Despite these promising findings, the authors highlighted some limitations, including heterogeneity in VR content, device types and procedure duration and stated that further research with a higher number of patients was needed to standardise VR protocols and confirm its efficacy in broader clinical settings.⁵

In this issue of Facts, Views & Vision, we publish two studies evaluating the efficacy and acceptability of VR in outpatient hysteroscopy. An RCT from Italy showed that the use of VR environments during outpatient hysteroscopic procedures significantly reduced perceived pain and anxiety levels amongst the VR group compared to controls,⁶ in keeping with earlier RCTs.⁵ A real-world observational series also showed potential efficacy, but uptake was relatively low, with only a third of women offered VR willing to use it.⁶ Thus, the place for VR within modern, outpatient hysteroscopic practice needs defining, which procedures and which patients. It seems clear that much remains to be done in pain perception during outpatient hysteroscopy. Recent guidelines state that information about treatment for pain should be addressed with patients before the procedure.⁷ VR technologies provide patients with more options for pain management during outpatient hysteroscopy.

We should also broaden our perspective beyond outpatient hysteroscopy, considering the implementation of VR in other areas of obstetrics and gynaecology. Satisfactory outcomes have already been documented in using VR for pain relief during the first stage of labour⁸ or in procedures such as amniocentesis⁹ albeit not during intrauterine device placement.¹⁰ Thus, VR could

potentially complement existing pain control options used in certain gynaecological and obstetric procedures, widening its impact and utility within women's health care.

We are aware that technology is transforming our daily lives, and the medical field is no exception. We have already normalised the use of telemedicine tools and the presence of surgical robots in our hospitals, maybe it is time to embrace other technologies, such as VR, to enhance patient care during outpatient, interventional procedures.

Acknowledgements: None.

Competing interests: No conflict of interest was declared by the author.

Funding: The author declared that this study received no financial support.

Ethical approval: Not required.

Informed consent: Not required.

References

1. Vitale SG, Haimovich S, Riemma G, Ludwin A, Zizolfi B, De Angelis MC, et al. Innovations in hysteroscopic surgery: expanding the meaning of "in-office". *Minim Invasive Ther Allied Technol.* 2021;30:125-32.
2. Zhuo M. Cortical excitation and chronic pain. *Trends Neurosci.* 2008;31:199-207.
3. Gupta A, Scott K, Dukewich M. Innovative technology using virtual reality in the treatment of pain: does it reduce pain via distraction, or is there more to it? *Pain Med.* 2018;19:151-9.
4. Chan E, Foster S, Sambell R, Leong P. Clinical efficacy of virtual reality for acute procedural pain management: a systematic review and meta-analysis. *PLoS One.* 2018;13:e0200987.
5. Baradwan S, Alshahrani MS, AlSghan R, Alyafi M, Elsayed RE, Abdel-Hakam FA, et al. The effect of virtual reality on pain and anxiety management during outpatient hysteroscopy: a systematic review and meta-analysis of randomized controlled trials. *Arch Gynecol Obstet.* 2024;309:1267-80.
6. Zizolfi B, Foreste V, Trinchillo MG, Borrelli D, Gallo A, De Angelis MC, et al. The impact of virtual reality technology in the era of See & Treat hysteroscopy: a randomised controlled trial. *Facts Views Vis Obgyn.*
7. Royal Collage of Obstetricians & Gynaecologist. Pain relief and informed decision making for outpatient hysteroscopy. *Good Practice Paper No. 16.* 2023.
8. Wong MS, Spiegel BMR, Gregory KD. Virtual reality reduces pain in laboring women: a randomized controlled trial. *Am J Perinatol.* 2021;38:e167-72.
9. Melcer Y, Maymon R, Gal-Kochav M, Pekar-Zlotin M, Levinsohn-Tavor O, Meizner I, et al. Analgesic efficacy of virtual reality for acute pain in amniocentesis: a randomized controlled trial. *Eur J Obstet Gynecol Reprod Biol.* 2021;261:134-8.
10. Dumont S, Page AS, Dewilde K, Ceusters J, Van Calster B, Froyman W, et al. Virtual reality simulation in reducing discomfort and pain during intrauterine device insertion: a randomized controlled trial. *Contraception.* 2025;110939.